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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,805	06/30/2003	Lizhong Sun	AMAT/6877/CMP/CMP/RKK	5060
44257	7590	02/10/2006	EXAMINER	
PATTERSON & SHERIDAN, LLP			ALEXANDER, MICHAEL P	
3040 POST OAK BOULEVARD, SUITE 1500			ART UNIT	
HOUSTON, TX 77056			PAPER NUMBER	

1742

DATE MAILED: 02/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/611,805

Applicant(s)

SUN ET AL.

Examiner

Michael P. Alexander

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/06/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

Claim(s) 1-19 is/are pending.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 3 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 3, the specification does not describe the method of planarizing, wherein the first positive potential is between about 4 volts and about 8 volts, and the second positive potential is between about 0.5 volts and about 4 volts.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 4-9, 11-13 and 15-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Uzoh et al. (US 5,911,619).

Regarding claim 1, Uzoh teaches (col. 4 line 35 – col. 5 line 21) a method of electrochemically and mechanically planarizing a surface of a substrate, comprising: providing an electrically conductive solution and an electrode in contact with the electrically conductive solution, disposing a polishing medium in contact with the electrically conductive solution, positioning a substrate having a conductive material formed thereon against the polishing medium so that a surface of the substrate contacts the electrically conductive solution and the polishing medium; applying a pulsed DC current to remove conductive material from the substrate and decreasing the current as the thickness of the conductive layer is decreased. The Examiner asserts that the applying the pulsed DC current step combined with decreasing the current as the thickness is decreased would inherently anticipate steps (d) and (e) of claim 1.

Regarding claim 2, Uzoh teaches (Fig. 11) that the polishing medium would comprise an electrode.

Regarding claims 4-5, Uzoh teaches (Fig. 14, col. 5 lines 9-21) that the current would be applied as a pulsed potential with a waveform.

Regarding claim 6, Uzoh teaches (col. 5 lines 41-64) providing relative motion between the substrate and the polishing medium.

Regarding claim 7, Uzoh teaches (Fig. 11) that the polishing medium comprises a conductive portion, and the conductive portion comprises an electrode.

Regarding claims 8-9, Uzoh teaches (col. 5 lines 9-21) providing a pulsed potential, which would inherently be modulated within a predefined range of potentials.

Regarding claim 11, Uzoh teaches (Fig. 11) that the polishing medium comprises a conductive polishing material or a composite of a conductive polishing material disposed in a conventional polishing material.

Regarding claim 12, Uzoh teaches (col. 4 lines 35-54) that the conductive material would be copper.

Regarding claim 13, Uzoh teaches (col. 4 line 55 – col. 5 line 9) further comprising applying a zero potential between the polishing medium and the electrode for a third time period.

Regarding claim 15, Uzoh teaches (Fig. 14b) that the first time period would be greater than the second time period.

Regarding claim 16, the Examiner would consider that one of the pulses of the decreased current would be the third positive pulse between the polishing medium and the electrode for a third time period.

Regarding claims 17-18, Uzoh teaches (Fig. 14, col. 5 lines 9-21) that the current would be applied as a pulsed potential with a waveform, which would include the first, second and third positive potentials.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1742

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 3 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh as applied to claim 1 above, and further in view of Bard et al. (Electrochemical Methods).

Regarding claim 3, Uzoh does not specify the voltage applied. However, it is well known as evidenced by Bard (page 86) that reaction rate is a strong function of potential in electrode reaction. It would have been obvious to one of ordinary skill in the art to select an initial voltage of about 4 volts or greater in to control the rate of the electropolishing reaction as evidenced by Bard. As such, the Examiner asserts that the method of Uzoh in view of Bard would inherently fulfill the claimed limitation that at least one pulse would have a first potential of between about 4 volts and about 8 volts, and at least one second pulse having a potential between about 0.5 volts and about 4 volts because Uzoh teaches that the current (and therefore also voltage) would decrease as the thickness of the conductive layer is decreased.

Regarding claim 14, Uzoh does not specify the potential applied. However, it is well known as evidenced by Bard (page 86) that reaction rate is a strong function of potential in electrode reaction. It would have been obvious to one of ordinary skill in the

Art Unit: 1742

art to select an initial voltage of about 4 volts to 8 volts in to control the rate of the electropolishing reaction as evidenced by Bard. As such, at least one pulse would have such third pulse would have the claimed voltage as the current is decreased with the decreasing thickness of the conductive layer.

Claims 10 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh as applied to claim 1 above, and further in view of (no secondary reference).

Regarding claim 10, Uzoh does not specify repeating steps (d) and (e). However, the Examiner asserts that mere duplication of steps has no patentable significance unless a new and unexpected result is produced. See MPEP 2144.04 VI B. It would have been obvious to one of ordinary skill in the art to modify the method of Uzoh by repeating steps (d) and (e) because a new and unexpected result would not be produced.

Regarding claim 19, Uzoh teaches applying a third positive or zero potential between the polishing medium and the electrode for a third time period (see the rejection of claims 13 and 17 above). Uzoh does not specify repeating steps (d) and (e). However, the Examiner asserts that mere duplication of steps has no patentable significance unless a new and unexpected result is produced. See MPEP 2144.04 VI B. It would have been obvious to one of ordinary skill in the art to modify the method of Uzoh by repeating steps (d) and (e) because a new and unexpected result would not be produced.

### ***Conclusion***

Art Unit: 1742

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Alexander whose telephone number is 571-272-8558. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 1742

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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